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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/002,714	11/01/2001	George S. Bokisa	MCGEP0178USA	3098

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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT

PAPER NUMBER

2827

DATE MAILED: 12/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/002,714

Applicant(s)

BOKISA ET AL.

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_ 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

1. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakayama et al., US Patent No. 4,935,312, hereafter Nakayama, in view of Tanimoto et al., US Patent No. 6,110,608, hereafter Tanimoto.

Regarding claims 1, 22, 25 and 26 Nakayama discloses a printed circuit board comprising:

electrical circuitry formed on an outer surface of the printed circuit board, the circuitry comprising copper or a copper alloy (copper foil 6 on polyimide film 7 etched to provide film carrier, see figure 2, column 7, line 1-15);

A final finish on the circuitry, the final finish comprising a coating of tin on the copper or copper alloy circuitry (tin plating 8, see figure 2, column 7, line 1-15); and an alloy cap layer on the tin coating (layer 9, see figure 2, column 7, line 1-15), except

the alloy cap layer comprising at least two immersion platable metals. The cap layer of Nakayama is of Indium. However, the alloy cap layer of two immersion platable metals is known in the art for better solderability. Tanimoto disclose such alloy cap layer, see Tanimoto, column 5, line 5-10. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board on Nakayama with alloy cap layer on tin coating layer as taught by Tanimoto in order to have a circuit board with excellent solderability.

Regarding the process limitation in claims 22, 25 and 26, the process limitation defines the claimed invention over the prior art to the degree that it defines the product itself. A process limitation cannot serve to patentably distinguish the product over the prior art, in the case that the product is the same as, or obvious over, the prior art. See Product-by-Process in MPEP 2113 and 2173.05(p) and *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985).

Regarding claims 2, 3, 4, 23 and 24 the combination of Nakayama and Tanimoto further discloses the immersion platable metals as Sn-Ag-Cu alloy, see Tanimoto, column 5,

line 5-20.

Regarding claim 12, the combination of Nakayama and Tanimoto discloses all the features claimed invention including one immersion platable metal other than tin as applied to claim 1-4 above.

Regarding claims 13 and 16, the combination of Nakayama and Tanimoto discloses all the features claimed invention including the alloy cap metal as applied to claim 2-4 above.

Regarding claim 14-15 and 17-18, the applicant is claiming the proportion of tin and silver in the alloy cap layer. The percentage of tin or silver will depend upon the combination of other alloying materials in the composition and can be adjusted to get better solderability at lower cost. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of combination of Nakayama and Tanimoto with tin and silver percentage as claimed in order to have better solderability.

Regarding claims 5 and 6, the combination of Nakayama and Tanimoto further discloses the tin layer from 0.5  $\mu\text{m}$  to 15  $\mu\text{m}$ , see Nakayama column 5, line 30-40 and Tanimoto column 5, line 34-40, which cover both ranges as claimed.

Regarding claims 7 and 8, the combination of Nakayama and Tanimoto discloses the alloy cap layer from 0.5  $\mu\text{m}$  to 5  $\mu\text{m}$ , though Tanimoto further discloses that the thickness less than 0.5  $\mu\text{m}$  or greater than 5  $\mu\text{m}$ , can be provided but will not give any additional advantages, see Tanimoto column 5, line 47-60.

Regarding claims 9, 19 and 27, the combination of Nakayama and Tanimoto further discloses the circuitry remains free of tin whiskers, (Tanimoto column 9, line 15-25).

Regarding claims 10, 11, 20, 21, 28 and 29, though the combination of Nakayama and Tanimoto does not explicitly disclose the specific duration for the board to remain whisker free and solderable, the crux of the invention is to make a circuit board to remain whisker free and solderable for a longer period without any deterioration. Therefore, it is inherent to have the whisker free and solderable life as claimed in claims 10 and 11.

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shih et al., discloses tin coated copper bonding pad by electroless plating.

Holtzman et al., discloses immersion tin coating on the metal layers.

Shimauchi et al., discloses a tin whisker-free tin or tin alloy plated electrical parts and structures.

Mehta discloses circuit board with tin plated circuit features.

Whacker et al., discloses tin coated copper circuits to be soldered after a substantial period of time.


Soutar et al., discloses process for immersion plating for protecting the metal pads and the through holes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp  
December 14, 2002

  
**DAVID L. TALBOTT**  
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